National Aeronautics and Space Administration

NASA**facts**

Aeronautics Research Mission Directorate

The first “A” in NASA stands for “Aeronautics.” For decades, NASA aeronautics researchers have developed technologies that improve the safety and efficiency of the U.S. air transportation system.

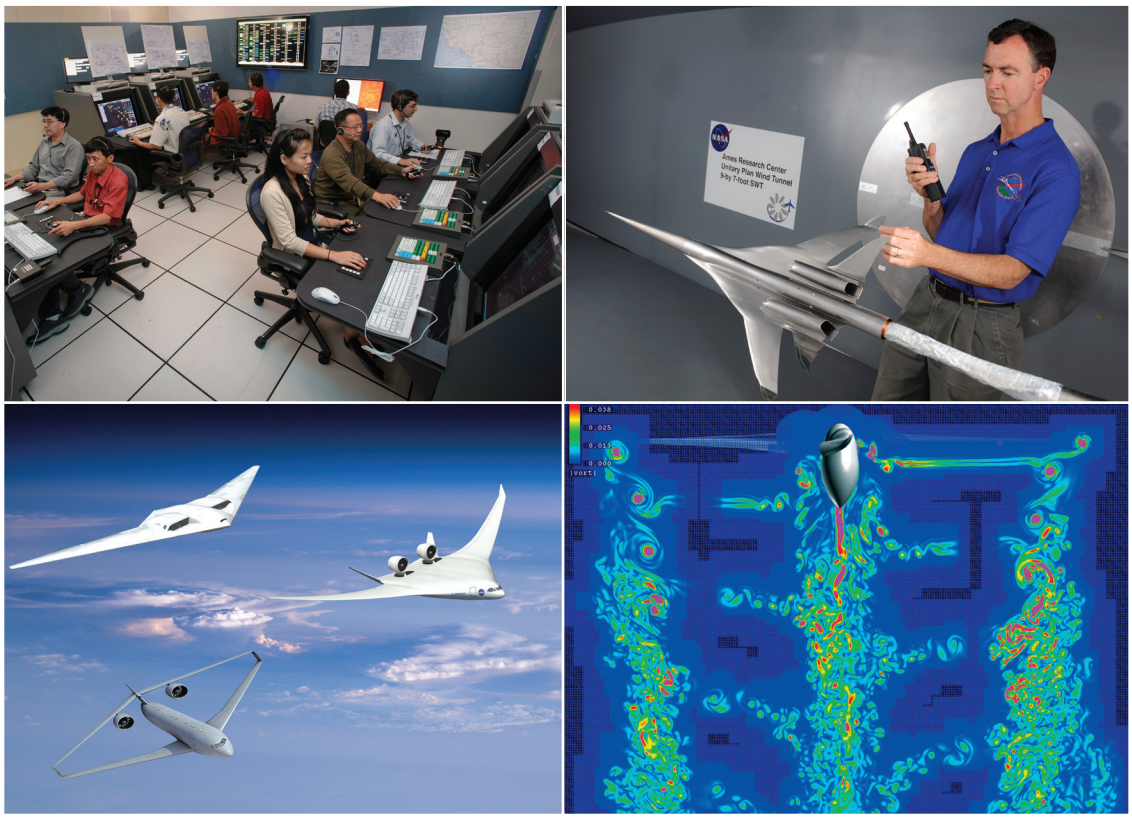
Aviation is vital to the nation’s economy. It remains one of the safest and most reliable ways to transport people and many of the things important to daily life such as electronics, mechanical parts for manufacturing, overnight packages, mail, pharmaceuticals, fresh flowers, fruits and vegetables.

The Aeronautics Research Mission Directorate, located at NASA Headquarters in Washington, DC, is responsible for ensuring that NASA’s research meets the needs of the nation, and makes air transportation more efficient, safe and environmentally friendly.

NASA Aeronautics is working to significantly:

- Improve gate-to-gate mobility and reduce delays;
- Reduce aircraft noise, emissions, fuel use and overall environmental impact on communities surrounding airports; and
- Maintain or improve the safety of aircraft in an increasingly complex system.

Aeronautics research takes place primarily at four NASA centers: Ames Research Center, Moffett Field, Calif.; Dryden Flight Research Center, Edwards, Calif.; Glenn Research Center, Cleveland; and Langley Research Center, Hampton, Va.



Images (Clockwise, from top-left) **Traffic Tools:** NASA aeronautics researchers work on a simulation to test computer tools that can improve air traffic flow and reduce delays. **Supersonic Some Day:** NASA’s Don Durston checks a supersonic aircraft model in a NASA wind tunnel that will generate data to help predict how well its shape would lower sonic boom noise levels over land. **Seeing the Solutions:** NASA develops state-of-the-art simulation tools to more accurately predict fluid flows and work on ways to improve them, in this case rotorcraft blades and the air vortices they create that lead to high noise levels. **Greener Flight:** These aircraft designs are among new ideas being explored by NASA that could meet tough goals for reducing fuel use, emissions and noise all at the same time.

INNOVATION FOR A PROSPEROUS NATION

Nearly every aircraft flying today has NASA-developed technology on board.

Most jet aircraft use a digital fly-by-wire system developed by NASA instead of a heavier hydraulic system for pilots to control the motion of the aircraft. Much of an aircraft's structure is made today from lightweight composite, or nonmetallic, materials; NASA first partnered with industry in the 1970s to advance the testing and development of composites.

NASA helped develop winglets—vertical extensions on the ends of wings—that reduce drag and save fuel. And NASA has supplied numerous software tools to air traffic controllers to help them better manage information on everything from aircraft arrivals to the movements of vehicles between terminal gates and on airport taxiways.

New aircraft just coming into service are also more efficient thanks to NASA-supported technologies. For example, chevrons—saw-tooth edges on the outside of jet engines—help reduce engine noise. New knowledge gained from laminar flow aerodynamics advanced by NASA helps make aircraft fly more efficiently at cruise speeds. Several types of new jet engines that produce less noise and emissions use components developed with NASA computer tools.

NASA's aeronautics research and development is organized in five programs:

Fundamental Aeronautics Program: Explores revolutionary changes for vehicles that fly at all speeds, from subsonic to hypersonic.

Airspace Systems Program: Develops technologies and knowledge that lead to significant increases in the capacity, efficiency and flexibility of the national airspace system.

Aviation Safety Program: Works on innovative technologies and knowledge to improve the safety of current and future aircraft.

Integrated Systems Research Program: Conducts research on the performance and benefits of promising ideas once they are integrated in an environment that matches the real world.

Aeronautics Test Program: Manages a set of flight and ground-based testing facilities available to NASA and the nation.

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We're Working on...

Exploring designs for future aircraft
http://www.nasa.gov/topics/aeronautics/features/greener_aircraft.html

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Solving the mystery of jet engine icing
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- Sector 33 Mobile App (air traffic control game)
  www.nasa.gov/sector33
- Solving Aviation's Challenges Through NASA Innovation (video)
  http://www.nasa.gov/multimedia/videogallery/index.html?media_id=89513121

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